

1146-159 Myocardial Blood Flow and Flow Reserve in Children After Arterial Switch Procedure

C.S. Duvernoy¹, M. Hauser, C. Meyer, I. Matsunaga, K. Buhlmeier, M. Schwaiger. ¹Division of Cardiology, University of Michigan, Ann Arbor, MI, USA; Departments of Nuclear Medicine and Pediatric Cardiothoracic Surgery, Technical University of Munich, Munich, Germany

Background: Children born with transposition of the great vessels currently undergo an arterial switch procedure in the neonatal period, and are subsequently largely asymptomatic. There is a low incidence of perfusion defects in this population.

Methods: We assessed myocardial blood flow (MBF) and myocardial vascular resistance (MVR) at rest and during maximal hyperemia using N-13 ammonia PET before and after intravenous adenosine infusion in 8 children (11 ± 2 yrs) status post arterial switch in the neonatal period, all of whom had no evidence of ischemia by exercise ECG and stress echocardiography. MBF and CFR values were compared with 9 healthy young adult volunteers (34 ± 10 yrs).

	Rst MBF	Rst MVR	Str MBF	Str MVR	CFR
Patients	0.74 ± 0.13	108 ± 24	2.48 ± 0.48	31 ± 8	3.39 ± 0.6
Normals	0.69 ± 0.07	133 ± 20	2.73 ± 0.29	31 ± 7	4.00 ± 0.62
p value	NS	0.04	NS	NS	0.04

Results: PET was well tolerated by all children. Resting and hyperemic MBF was not significantly different between subjects and normals, but CFR was significantly lower in patients. No child had a CFR value more than 2.5 SD below the average for normals. A stress-induced perfusion defect was noted in 1 patient; this patient had the lowest CFR value as well.

Conclusions: Myocardial blood flow is within normal range in children with surgically corrected transposition of the great arteries, although CFR is reduced when compared with young adults. PET may be a useful quantitative tool to monitor changes in coronary flow in patients with congenital heart disease. Its clinical significance remains unproven.

1146-160 The Medium Term Findings in Coronary Arteries by Intravascular Ultrasound in Infants and Children After Heart Transplantation

M.A. Kuhn, K.R. Jutzy, S.D. Fritzsche, C.E. Cephus, D.D. Dering, L.L. Bailey, R.E. Chinnock, R.L. Larsen. Loma Linda University, Loma Linda, CA, USA

Background: Intravascular ultrasound (IVUS) has been shown to be a sensitive tool in the detection of post-transplant coronary artery disease (PTCAD) in adults. Similar findings have been seen in initial studies with children.

Methods: This study compared the medium term findings of IVUS in children who underwent heart transplant (htx) at > 1 yr of age (gp 1) to those who underwent htx at < 1 yr of age (gp 2). Between 7/96 and 6/97, 30 children (gp 1: n = 17, gp 2: n = 13) had IVUS performed at the time of the annual catheterization. A total of 390 segments were evaluated in 39 vessels (LAD 25, Cx 4, RCA 10). Mean total area (TA), mean lumen area (LA), maximal intimal thickness (MIT), and intimal index (II) (TA-LA/TA) were calculated by planimetry. The degree of intimal thickening was classified using the Stanford scale. The patient demographics are shown in the table below.

	Age at htx	Age at cath	Years since htx
Gp 1	10 ± 5 yrs	14 ± 5 yrs	4 ± 2 yrs
Gp 2	2 ± 2 mos	8 ± 1 yrs	8 ± 1 yrs

Results: Comparison of MIT and II are shown in the table below.

	Gp 1	Gp 2	p-value
MIT (mm)	0.26 ± 0.14	0.04	0.001
II (%)	11 ± 7	7 ± 3	0.04

Both MIT and II were significantly greater in gp 1 than in gp 2. PTCAD based on the Stanford classification (see table to the right) was more severe in gp 1 compared to gp 2. The number of rejection episodes correlated with the MIT in gp 1 (r = 0.56, p = 0.02), but not in gp 2 (r = 0.21, p = 0.5). The number of rejection episodes did not differ between the two groups. CMV status did not correlate in either group.

Class	1	2	3	4
Gp 1	7	6	3	1
Gp 2	10	3	0	0

Conclusions: This study suggests that medium term survivors who had a htx at < 1 yr of age had less PTCAD detected by IVUS when compared to medium term survivors who had a htx > 1 yr of age.

1147 Local Vascular Responses: Endothelial Function and Dysfunction

Tuesday, March 31, 1998, 3:00 p.m.-5:00 p.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 4:00 p.m.-5:00 p.m.

1147-53 Allopurinol Improves Endothelial Function in NIDDM, but has no Effect in Aged-matched and Young Non-diabetic Controls

R. Butler¹, A.D. Morris², A.D. Struthers¹. ¹University Department of Clinical Pharmacology, Ninewells Hospital and Medical School, Dundee, DD1 9SY, UK; ²University Department of Medicine, Ninewells Hospital and Medical School, Dundee, DD1 9SY, UK

Background: There is evidence that anti-oxidant therapies improve endothelial function (EF) in diabetic patients. Xanthine oxidase is a key free radical enzyme generating system and therefore allopurinol, a xanthine oxidase inhibitor may produce a similar beneficial effects on EF.

Methods: We examined 34 patients (11 patients with NIDDM, mean age (MA) = 65 years; 12 similar aged controls, MA = 59 years and 11 young healthy volunteers, MA = 25 years) treated with 300 mg of allopurinol (1 month) in a randomised, placebo controlled, double-blind, cross-over study. EF was assessed by bi-lateral forearm venous occlusion plethysmography using endothelial dependent (acetylcholine) and endothelial independent vasodilators (sodium nitroprusside).

Results: Forearm blood flow (FBF) response to acetylcholine showed a significant increase with allopurinol therapy in the NIDDM subgroup (2.63 vs 2.16 ml/100 ml/min; allopurinol vs placebo p = 0.01; 95% CI 0.11, 0.83) but no improvement with nitroprusside. There was a significant reduction in malonyl-dialdehyde (MDA) (0.30 vs 0.34 μM; allopurinol vs placebo p = 0.02). There was no difference in HbA1C, cholesterol or blood pressure between the study days. There was no significant difference between either endothelial dependent or independent response in either the young or old normal subgroups. These results indicate for the first time that the allopurinol improves EF but only in NIDDM. Allopurinol may decrease free radical generation increasing nitric oxide bioavailability.

1147-54 A Comparative Study of Four Anti-hypertensive Agents on Endothelial Function in Patients With Coronary Disease

T.J. Anderson¹, R.W. Overhiser, H. Haber, F. Charbonneau². ¹Foothills Hospital, Calgary, Canada; ²Royal Victoria Hospital, Montreal, Canada

Background: Quinapril, an ACE inhibitor with high affinity, has been shown to improve coronary endothelial dysfunction in patients with CAD. The effectiveness of different vasoactive agents to improve human endothelial function is unknown. In the BANFF study, we used high resolution ultrasound to compare the chronic effects of four anti-hypertensives on brachial artery flow-mediated vasodilation (FMD) in patients with documented CAD.

Methods: Patients were enrolled in a partial-block, cross-over design trial, and randomized in one of four different, open label drug sequences. The core ultrasound lab and data analysis center were masked to treatment. FMD and NTG-induced dilation were evaluated before and after 8 weeks of each study drug. Two week washout was imposed between treatments.

Results: CAD patients had significantly impaired FMD (6.2 ± 0.6%, n = 80) compared to normals (10.9 ± 0.8%, N = 40, p < 0.05). Absolute changes in FMD from baseline are shown below.

Drug	N	ΔFMD (Mean ± SE)	p value
Quinapril 20 mg	56	1.8 ± 1.0%	0.02
Enalapril 10 mg	55	-0.2 ± 0.8%	0.84
Losartan 50 mg	38	0.8 ± 1.1%	0.57
Amlodipine 5 mg	45	0.3 ± 0.9%	0.97

No significant differences in NTG-induced dilation were observed

Conclusion: Only quinapril was associated with significant improvement in flow mediated dilation. ACE inhibitors may differ in their ability to improve vascular endothelial function.

1147-55 Adenosine and Nitrates Interaction at Coronary Macro- and Microcirculatory Level in Patients With Syndrome X

C. Palombo, M. Kozáková, G. Bigalli, M. Del Tacca. CNR Clinical Physiology Institute and Chair of Pharmacology, University of Pisa, Italy

Background: an endothelial dysfunction is reported in Syndrome X (SX). In